Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

Application of	)	
DIRECTV ENTERPRISES, LLC	)	File No. _____
For Authorization to Operate DIRECTV 1R, a Direct Broadcast Satellite, at 56.16° E.L.	)	

APPLICATION FOR AUTHORIZATION TO OPERATE DIRECTV 1R, A DIRECT BROADCAST SATELLITE

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TABLE OF CONTENTS

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OPERATE DIRECTV 1R, A DIRECT BROADCAST SATELLITE

DIRECTV Enterprises, LLC ("DIRECTV") hereby requests authorization to operate DIRECTV 1R, a satellite in the Direct Broadcast Satellite ("DBS") service, at the nominal 56.16° E.L. orbital location, where it will operate in accordance with the Russian Administration's ITU filings at that location to ensure continuity of service to DBS subscribers currently served by the Bonum 1 satellite.

I. BACKGROUND

DIRECTV currently operates a DBS system consisting of six high-power DBS satellites at the nominal 101° W.L., 110° W.L., and 119° W.L. orbital locations, as well as five Ka-band satellites at three orbital locations. Using these assets, DIRECTV offers more than 2,000 digital video and audio channels of entertainment, educational and informational programming to more than 19 million subscribers throughout the United States who receive this programming using small dish antennas.

From its launch in October 1999 until March 2007, DIRECTV 1R operated under a Commission-issued license at the 101° W.L. orbital location.[1] In 2007, the satellite was relocated to the 72.5° W.L. position allocated to Canada under the ITU's AP 30/30A Region 2 Plan for the Broadcast Satellite Service, at which time the satellite's U.S. license was terminated.[2] Until December 31, 2011, the satellite operated at that location pursuant to a Canadian authorization to provide local-into-local programming to DIRECTV subscribers in the United States. Upon expiration of the arrangement between DIRECTV and Telesat Canada for operation at 72.5° W.L., DIRECTV completed the transition of the markets previously served from that location to other satellites in its fleet, and relocated the satellite to the nominal 110º W.L. orbital location pending further authorization.[3]

DIRECTV originally sought to re-license DIRECTV 1R once again as a U.S.-flagged space station to act as an in-orbit spare at the nominal 110° W.L. orbital location.[4] DIRECTV subsequently decided simply to de-orbit the satellite. However, an immediate need for DIRECTV 1R has arisen through which it can ensure continuity of service for another DBS operator. The Russian Satellite Communications Company ("RSCC") operates Bonum 1 at the 56º E.L. orbital location. The satellite was launched

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1 *See DIRECTV Enterprises, Inc.*, 14 FCC Rcd. 13159 (Int'l Bur. 1999).

2 *See* Stamp Grant, IBFS File No. SAT-STA-20061213-00149 (Mar. 8, 2007); Public Notice, Rep. No. SES-00909, IBFS File No. SES-MFS-20061213-02157 (Mar. 14, 2007) (together, authorizing relocation of DIRECTV 1R and receipt of signals from that Canadian orbital location by small receive dishes in the U.S.).

3 *See* Stamp Grant, IBFS File No. SAT-STA-20111206-00235 (Jan. 6, 2012) (granting special temporary authority to relocate DIRECTV 1R to 109.8º W.L.).

4 *See* IBFS File No. SAT-A/O-20111205-00233. This application has been withdrawn. *See* Public Notice, Rep. No. SAT-00887, DA 12-1258 (Aug. 3, 2012).

in November 1998 with an expected lifetime of 11.5 years. In order to extend its useful life, the satellite is being operated in an increasingly inclined orbit which has begun to compromise its ability to provide reliable service to RSCC's subscribers in Russia. RSCC is currently constructing a replacement satellite, Express-AT1, but due to unforeseen delays that satellite will not be ready to begin commercial service until late next year.

Accordingly, RSCC, Intelsat, and DIRECTV have entered into a commercial arrangement to bridge the unexpected gap in replacement. Under this arrangement, DIRECTV 1R will be migrated to 56.16º E.L.[5] Upon its arrival, some of the traffic on Bonum 1 will be transferred to those transponders on DIRECTV 1R that operate in the portion of the downlink band allocated to BSS service in Region 1 (*i.e.*, 12.2-12.5 GHz).[6] Bonum 1 will continue to carry the remaining traffic (that has not been transferred to DIRECTV 1R). Once Express-AT1 arrives on station, both satellites will transfer their traffic to that replacement satellite. At that point, DIRECTV anticipates that it will deorbit DIRECTV 1R to a disposal orbit consistent with the IADC guidelines, and RSCC has agreed to do the same with Bonum 1.

II. GRANT OF THIS APPLICATION WOULD SERVE THE PUBLIC INTEREST

Authorizing DIRECTV to operate the DIRECTV 1R satellite at 56.16º E.L. will serve the public interest in several ways. First, it will enable DIRECTV and Intelsat to ensure continuity of service to RSCC's subscribers. Second, it will make possible the

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[5] DIRECTV is filing a separate application for special temporary authority to cover DIRECTV 1R's drift from 109.8° W.L. to 56.16° E.L.

[6] The arrangement has a term of 14 months, with an option for Intelsat to extend by another three months. However, it gives DIRECTV the right to decommission the satellite in accordance with Commission policies at any point within that term.

intensive use of valuable orbital/spectrum resources from a satellite that otherwise would have been deorbited. Third, relocation of this satellite will not cause any loss in service to U.S. consumers, as DIRECTV has determined that the satellite is unnecessary for its current needs. Fourth, as part of the commercial arrangement, RSCC has agreed to deorbit Bonum 1 to an altitude consistent with the IADC guidelines. This will help ensure that the satellite achieves a secure disposal orbit.

For the foregoing reasons, DIRECTV requests that the Commission grant this application as expeditiously as possible.

III. INFORMATION REQUIRED UNDER SEC. 25.114 OF THE COMMISSION'S RULES

1. Name, Address, and Telephone Number of Applicant

DIRECTV Enterprises, LLC
2230 East Imperial Highway
El Segundo, CA 90245
(310) 964-0700

2. Name, Address, and Telephone Number of Counsel

William M. Wiltshire
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1200 Eighteenth Street, N.W.
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3. Type of Authorization Requested

DIRECTV hereby applies for authority to operate a DBS satellite, DIRECTV 1R, at the 56.16° E.L. orbital location under the Russian AP 30/30A filings RST-2 and RST-2A, where it will operate in inclined orbit in order to conserve fuel. DIRECTV 1R will operate initially in only a portion of the DBS band: 12.2-12.5 GHz (downlink) and 17.3-17.6 GHz (uplink). Although DIRECTV is not currently requesting authority to operate in the remaining portion of the BSS band at this time (*i.e.*, 12.5-12.7 GHz/17.6-17.8

GHz) and would therefore seek additional authority before operating the satellite's communications payload in that portion of the band, it provides information with respect to that portion of the payload as well.

4. General Description of Overall System Facilities, Operations and Services

DIRECTV 1R will consist of a geostationary satellite located at the 56.16° E.L. orbital location and associated ground station equipment. DIRECTV 1R is a high-power satellite designed to provide DBS service in the ITU AP30/30A bands for Region 2 (12.2-12.7 GHz (space-to-Earth) and 17.3-17.8 GHz (Earth-to-space)). It is capable of providing 32 operating uplink and downlink Ku-band transponders in both right hand and left hand circular polarizations ("RHCP" and "LHCP"),[7] transmitting digital video and audio entertainment across a wide area to millions of customers using small receive antennas. Each transponder has a usable bandwidth of 24 MHz. Beam coverage encompasses Russia.

5. Operational Characteristics

The operational characteristics of DIRECTV 1R and its compliance with Part 25 of the Commission's rules are contained in FCC File Number SAT-LOA-19990331-00035. This submission updates some of the information that is contained in SAT-LOA-19990331-00035 and provides information that is specific to its proposed operation at 56.16° E.L.

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[7] Note that DIRECTV 1R would operate at the 56.16° E.L. location only in the portion of the DBS band that overlaps with the ITU AP 30/30A Plan for Region 1, *i.e.*, from 12.2-12.5 GHz/17.3-17.6 GHz.

5.1 Frequency and Polarization Plan

Details of the frequency and polarization plan of the DIRECTV 1R satellite, including TT&C functions, are included in the accompanying Schedule S, which is hereby incorporated by reference as if fully set forth herein. The interconnection capability of the DIRECTV 1R transponders is also shown in the accompanying Schedule S. The emission designator for transmission of communications signals in the uplink and downlink is 24M0G7W. The allocated bandwidth for this emission is 24 MHz.

5.2 Communications Payload and Antenna Gain Contours

A description of the DIRECTV 1R communications payload is provided in SAT-LOA-19990331-00035, and included herein by reference. The co-polarized contour patterns of DIRECTV 1R operating at 56.16° E.L. are shown in Appendix B, as well as being included in the attached Schedule S. The peak antenna gain, G/T, SFD ("Saturated Flux Density") and EIRP level for each uplink and downlink beam, as appropriate, are also provided in Appendix B, as well as in the attached Schedule S. The beam performance information contained herein updates that contained in SAT-LOA-19990331-00035.

5.3 TT&C Subsystem and Antenna Gain Contours

Description of the DIRECTV 1R TT&C subsystem is provided in SAT-LOA-19990331-00035. The co-polarized contour patterns of DIRECTV 1R operating at 56.16° E.L. are shown in Appendix B. Note that the on-station telemetry is transmitted by the downlink communications antenna. The beam performance information contained herein updates that contained in SAT-LOA-19990331-00035.

6. Orbital Locations

The DIRECTV 1R satellite will be placed at the 56.16° E.L. orbital location. DIRECTV will operate in a manner that is consistent with the technical characteristics of the Russian Administration's ITU AP 30/30A satellite networks RST-2 and RST-2A at that location.

7. Service Description, Link Description and Performance Analysis, Earth Station Parameters

7.1 Service Description

DIRECTV and Intelsat have entered into a commercial arrangement under which the DIRECTV 1R satellite will be used by a Russian DBS provider to retransmit digital video and audio entertainment programming to its subscribers in Russia, who receive this programming using small dish antennas.

7.2 Link Performance

Representative communications link budgets are shown in Appendix A. Note that these budgets assume receive antennas of 60 cm and 90 cm and also include an entry for adjacent satellite interference from neighboring DBS satellites.

7.3 Earth Station Parameters

There are essentially two types of earth stations used in the DIRECTV 1R DBS network: feeder-link earth stations and subscriber terminals. The feeder-link stations are relatively large 5 meter transmit antennas. The subscriber terminals are effectively 60 cm or 90 cm receive antennas that are installed at the customers' premises and have fixed pointing, which is optimized at installation.

8. Satellite Orbit Characteristics

The DIRECTV 1R satellite will be maintained in inclined geosynchronous orbit at its nominal orbital location with an East-to-West station-keeping tolerance of ±0.05° and an initial North-to-South inclination of approximately 0.5° with an expected increase in inclination of 0.9° per year.

9. Power Flux Density

There are no power flux density limits in the DBS bands. However, No. 21.16 of the ITU Radio Regulations does specify power flux density limits in the 12.2 – 12.75 GHz band for satellites operating in the Fixed Satellite Service in ITU Region 3. Although DIRECTV 1R would be operating under the BSS filings of Russia, nevertheless, power flux density levels were calculated and compared against the limits specified in No. 21.16 for the Fixed Satellite Service. The results are provided in Appendix C and show that the downlink power flux density levels of the DIRECTV 1R carriers do not exceed the limits specified in No. 21.16 of the ITU Radio Regulations.

10. Arrangement for tracking, telemetry, and control

DIRECTV 1R's TT&C operations will be performed by Intelsat. The control center is located at Intelsat's facilities in Washington D.C. and Long Beach, California. The primary TT&C link will be provided by RSCC's facility in Dubna, Russia. The back-up and emergency TT&C link will be provided by Intelsat's uplink facilities in Fucino, Italy and Kumsan, South Korea.

11. Physical Characteristics of the Space Station

The physical characteristics of the DIRECTV 1R satellite are as provided in the accompanying Schedule S.

12. Common Carrier Status

DIRECTV intends to operate DIRECTV 1R on a non-broadcast, non-common carrier basis. DIRECTV may sell and/or lease a portion of its capacity on a non-common carrier basis.

13. Schedule

DIRECTV 1R was launched in October 1999, and has been successfully operating in-orbit since that time pursuant to U.S. and Canadian authorizations.

14. Public interest Considerations

See Section II above.

15. Interference Analysis

Modification of the Region 1 BSS Plan for DIRECTV 1R at 56° E.L. (nominal) will not be necessary. DIRECTV 1R will operate within the technical envelope of the RST-2 and RST-2A ITU filings.

16. Orbital Debris Mitigation

This section provides the information required under Section 25.114(d)(14) of the Commission's rules.

Spacecraft Hardware Design

DIRECTV has assessed and limited the amount of debris released in a planned manner during normal operations of DIRECTV 1R. No debris is generated during normal on-station operations, and DIRECTV does not intend to release debris during the planned course of operations of the satellite. The spacecraft will remain in a stable configuration, operating outside of the station keeping volume assigned to any other spacecraft, including Bonum 1.

DIRECTV has also considered the possibility of DIRECTV 1R becoming a source of debris by collisions with small debris or meteoroids that could cause loss of control of the spacecraft and prevent post-mission disposal. As such, DIRECTV has taken steps to address this possibility by incorporating redundancy, shielding, separation of components, and other physical characteristics into the satellite's design. For example, omni-directional antennas have been mounted on opposite sides of the spacecraft. The command receivers and decoders, telemetry encoders and transmitters, and the bus control electronics are fully redundant, physically separated, and located within a shielded area to minimize the probability of the spacecraft becoming a source of debris due to a collision.

Minimizing Accidental Explosions

DIRECTV has assessed and limited the probability of accidental explosion during and after completion of mission operations. The key areas reviewed for this purpose included leakage of propellant and mixing of fuel and oxidizer as well as battery pressure vessels. The basic propulsion design (including component and functional redundancy, and the placement of fuel tanks inside a central cylinder which provides a high level of shielding), propulsion subsystem component construction, preflight verification through both proof testing and analysis, and quality standards were designed to ensure a very low risk of propellant leakage and fuel and oxidizer mixing that can result in subsequent explosions. During the mission, batteries and various critical areas of the propulsion subsystem are continually monitored (for both pressure and temperature) to preclude conditions that could result in the remote possibility of explosion and subsequent generation of debris.

After DIRECTV 1R reaches its final disposal orbit, all on-board sources of stored energy will be depleted or secured, all fuel line valves will be left "open," and all batteries will be left in a permanent discharge state. The solar cells will be slewed away from the sun to minimize power generation. However, the helium pressurant for the vessels that were used during orbit raising were permanently isolated from the propulsion system by firing a pyrotechnic valve at the beginning of on-orbit life. As a result, the residual gas cannot be vented at the end of the satellite's operational life. In addition, because the satellite's XIPS propulsion system has failed, there is no way to deplete the xenon below the level currently in the tanks.

The approximate amount of residual helium and xenon gas that cannot be vented at the end of operational life is shown in the table immediately below:

TANK	VOLUME (M^3)	PRESSURE (KPA)	TEMP. (° C)	MASS (KG)
HE1	0.0428	4050	20	0.2790
HE2	0.0429	4050	20	0.2798
XE1	0.0325	1820	20	3.5775
XE2	0.0326	1820	20	3.5838

These tanks are well shielded, and the residual pressure in the tanks will be well below their maximum rating. Moreover, a leaking pressurized vessel could not cause the spacecraft to leave its storage orbit, as expulsion of pressurized gas would cause the spacecraft to tumble and the delta V (*i.e.*, the thrust) would be randomly distributed, and thus would have very little effect on the orbit apogee and perigee. In Section IV below, DIRECTV requests any necessary waiver of Sections 25.114(d)(14)(ii) and 25.283(c) in connection with the residual gas that will remain in these tanks at the end of the satellite's useful life.

Safe Flight Profiles

DIRECTV has assessed and limited the probability of DIRECTV 1R becoming a source of debris due to collisions with large debris or other operational space stations. DIRECTV has assessed the possibility of collision with satellites located at, or reasonably expected to be located at, the requested orbital location or assigned in the vicinity of that location.

Regarding avoidance of collisions with controlled objects, in general, if a geosynchronous satellite is controlled within its specified longitude and latitude station keeping limits, collision with another controlled object (excluding where the satellite is collocated with another object) is the direct result of that other object entering the allocated space. The instant application seeks authority for continued operation of DIRECTV 1R at the 56.16° E.L. orbital location. DIRECTV is not aware of any other FCC or non-FCC licensed spacecraft that are operational or planned to be deployed near the 56.16° E.L. orbital location such that there would be an overlap with the requested station keeping volume of DIRECTV 1R.

Post-Mission Disposal

Although not subject to the requirements of Section 25.283(a) of the Commission's rules,[8] at the end of the operational life of the satellite, DIRECTV will maneuver DIRECTV 1R into a disposal orbit with an altitude no less than that calculated using the IADC formula:

$$36{,}021 \text{ km} + (1000 \cdot C_R \cdot A/m).$$

The calculated value of $C_R A/m$ in this instance is based on the following parameters:

[8] *See* 47 C.F.R. § 25.283(d).

C_R = Solar Pressure Radiation Coefficient = 1.5

A/M = Area-to-mass ratio = 0.039 m^2/kg

Using these values in the IADC formula results in a minimum de-orbit altitude of 36,079.5 km, or approximately 293.5 km above geosynchronous altitude. To provide adequate margin, the nominal disposal orbit will be increased above this calculated value of 36,079.5 km to a value of 36,086 km, resulting in a disposal orbit approximately 300 km above geosynchronous altitude. Approximately 39.6 kg of propellant will be allocated and reserved for final orbit raising maneuvers to this altitude. This value was determined through a detailed propellant budget analysis. In addition, DIRECTV has assessed fuel gauging uncertainty and this budgeted propellant provides an adequate margin of fuel reserve to ensure that the disposal orbit will be achieved despite such uncertainty.[9]

In addition, the following information is provided:

1) Planned orbital eccentricity: 0.00035 (This is a best estimate of optimal eccentricity to match the natural eccentricity circle due to Sun and Moon perturbations after decommission.[10])

2) Planned apogee altitude: 330.5 km

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[9] Note that DIRECTV anticipates that 10.2 kg of propellant will be required to de-orbit DIRECTV 1R to the required altitude. An additional 29.4 kg of propellant is being reserved to account for fuel gauging uncertainties.

[10] Because it is extremely difficult to anticipate end-of-life thruster performance and operational conditions, it is extremely difficult to achieve the planned eccentricity. DIRECTV's priority is to achieve the planned minimum perigee of 300 kilometers. In order to achieve the planned eccentricity, not only must there be sufficient propellant reserved but, in addition, individual thrusters must be fired at specific times during satellite decommissioning because the timing of thruster firing will affect eccentricity. Due to difficulties in predicting the thruster end-of-life performance, as well as earth station availability and visibility as the satellite drifts, it may not be possible to fire the right thrusters at the optimal times. Thus, optimal eccentricity may not be achieved, which, in turn, will affect the apogee altitude.

3) Information concerning the methods that will be used to assess and provide adequate margins concerning fuel gauging uncertainty: For the DIRECTV 1R spacecraft, in addition to the nominal hold-back and reserves provided to us by the manufacturer, DIRECTV reviews the current propellant usage – particularly the mixing ratio – to properly allocate sufficient margin to account for unavailable propellant that may result from a non-optimal mixing ratio. In addition, DIRECTV performs thermal gauging near the spacecraft's end of life by inferring the remaining propellant from the thermal signature when heat is applied to different parts of the propellant tank system. This information is considered when determining the additional hold-back and adjustments to book values to attempt to ensure sufficient propellant to achieve the planned minimum altitude.

DIRECTV 1R was launched in October 1999, designed for an operational and mission life of approximately 15 years.[11] Based on the amount of fuel remaining after relocation to the 56.16° E.L. orbital location, assuming inclined orbit operations and reserving sufficient remainder to achieve a disposal orbit approximately 300 km above geosynchronous altitude, DIRECTV currently estimates that the satellite has a remaining useful life of approximately 4.5 years.

IV. WAIVER REQUEST

To the extent necessary, DIRECTV seeks waiver of Sections 25.114(d)(14)(ii) and 25.283(c) of the Commission's rules in connection with the re-authorization of DIRECTV 1R. These rules address requirements relating to venting stored energy

[11] *See* IBFS File No. SAT-LOA-19990331-00035, Application Narrative, Appendix A, at 4 (filed Mar. 31, 1999).

sources at the spacecraft's end of life.[12] DIRECTV 1R is a Boeing 601 model spacecraft and was constructed and launched years before the venting requirement in Section 25.283(c) was even proposed.[13] As described in more detail in Section 18 above, the helium tanks on the spacecraft were sealed following completion of launch phase and the xenon tanks cannot be further depleted due to failure of the XIPS propulsion system. Accordingly, those tanks will retain residual pressure at end of life. Given the spacecraft design, it is physically impossible for DIRECTV to vent the helium and xenon tanks in order to comply with Section 25.283(c).

Granting the requested waiver of these rules would be consistent with Commission precedent and policy, as the criteria justifying a waiver are present in this case.

> The Commission may waive a rule for good cause shown. Waiver is appropriate if special circumstances warrant a deviation from the general rule and such deviation would better serve the public interest than would strict adherence to the general rule. Generally, the Commission may grant a waiver of its rules in a particular case if the relief requested would not undermine the policy objective of the rule in question and would otherwise serve the public interest.[14]

Accordingly, the Commission has in the past waived these provisions on several occasions in extending the term of a satellite license for in-orbit spacecraft with similar

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[12] Section 25.283(c) contains the substantive venting requirement, while Section 25.114(d)(14)(ii) requires applicants to submit information that addresses "whether stored energy will be removed at the spacecraft's end of life."

[13] *See Mitigation of Orbital Debris*, Notice of Proposed Rulemaking, 17 FCC Rcd. 5586 (2002) (released March 18, 2002).

[14] *PanAmSat Licensee Corp.*, 17 FCC Rcd. 10483, ¶ 22 (Int'l Bur. 2002) (footnotes omitted).

limitations.[15] The Commission has even waived Section 25.283(c) in a number of cases to permit launch and operation of spacecraft that do not allow for full venting of pressure vessels at end of life, based on a finding that modifying the space station design at a late stage of construction would pose an undue hardship.[16]

In the case of DIRECTV 1R, which was launched and operational years before the venting requirements were even proposed, there is no question of bringing the satellite into compliance with the rule. Because DIRECTV 1R is already in orbit, DIRECTV can do nothing to enable full venting of residual pressure in the helium and xenon tanks. Given this reality, waiver is clearly warranted. There is no possible public interest benefit in requiring strict adherence to a rule with which the licensee is incapable of complying, and grant in these special and limited circumstances would not undermine the policy objective of the rule.

V. CONCLUSION

In summary, re-licensing the proposed space station will provide DIRECTV with a highly capable DBS satellite that can be used to ensure the continuation of service for

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[15] *See, e.g., SES Americom, Inc.*, File No. SAT-MOD-20110718-00130 , Grant Stamp Attachment at ¶ 2 (granted Oct. 13, 2011) ("We grant the requested waiver because AMC-1 was launched before Section 25.283(c) became effective and compliance would require direct retrieval of the spacecraft, which is not currently possible"); *SES Americom, Inc.*, File No. SAT-MOD-20101215-00261, Grant Stamp Attachment at ¶ 4 (granted Mar. 8, 2011) (same); *XM Radio Inc.*, File No. SAT-MOD-20100722-00165, Grant Stamp Attachment at ¶ 2 (granted Oct. 14, 2010) (same).

[16] *See, e.g., DIRECTV Enterprises, LLC*, File No. SAT-LOA-20090807-00086, Grant Stamp Attachment at ¶ 4 (granted Dec. 15, 2009) (granting a partial waiver of Section 25.283(c) for DIRECTV-14, a Boeing 702 model spacecraft, on grounds that requiring modification of the satellite would present an undue hardship *EchoStar Satellite Operating Corp.*, File No. SAT-LOA-20071221-00183, Grant Stamp Attachment at ¶ 4 (granted Mar. 12, 2008) (same for AMC-14, a Lockheed Martin A2100 model spacecraft); *PanAmSat Licensee Corp.*, File Nos. SAT-MOD-20070207-00027 and SAT-AMD-20070716-00102, Grant Stamp Attachment at ¶ 7 (granted Oct. 4, 2007) (same for Intelsat 11, an Orbital Sciences Star model spacecraft).

another satellite operator. For these reasons, DIRECTV submits that the proposed satellite will serve the public interest and respectfully requests that the Commission expeditiously grant this application.

Respectfully submitted,

DIRECTV ENTERPRISES, LLC

By: __/s/_____
Romulo Pontual
Executive Vice President

ENGINEERING CERTIFICATION

The undersigned hereby certifies to the Federal Communications Commission as follows:

(i) I am the technically qualified person responsible for the engineering information contained in the foregoing Application,

(ii) I am familiar with Part 25 of the Commission's Rules, and

(iii) I have either prepared or reviewed the engineering information contained in the foregoing Application, and it is complete and accurate to the best of my knowledge and belief.

Signed:

/s/

Jack Wengryniuk

August 17, 2012

Date

APPENDIX A

DIRECTV 1R LINK BUDGET ANALYSIS

Table A.1: DIRECTV 1R Link Budgets

UPLINK BEAM INFORMATION		
Uplink Beam Name	RUSSIA	RUSSIA
Uplink Frequency (GHz)	17 45	17 45
Uplink Beam Polarization	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6 0	-6 0
Uplink Contour G/T (dB/K)	8	8
Uplink SFD (dBW/m2)	-79 8	-79 8
Rain Rate (mm/hr)	22 0	22 0
DOWNLINK BEAM INFORMATION		
Downlink Beam Name	RUSSIA	RUSSIA
Downlink Frequency (GHz)	12 350	12 350
Downlink Beam Polarization	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4 0	-6 0
Downlink Contour EIRP (dBW)	53 8	51 8
Rain Rate (mm/hr)	22 0	22 0
ADJACENT SATELLITE 1		
Satellite 1 Orbital Location	51 2E	51 2E
Uplink Power Density (dBW/Hz)	-45 0	-45 0
Uplink Polarization Advantage (dB)	0 0	0 0
Downlink EIRP Density (dBW/Hz)	-21 4	-21 4
Downlink Polarization Advantage (dB)	0 0	0 0
ADJACENT SATELLITE 2		
Satellite 1 Orbital Location	60 66E	60 66E
Uplink Power Density (dBW/Hz)	-45 0	-45 0
Uplink Polarization Advantage (dB)	0 0	0 0
Downlink EIRP Density (dBW/Hz)	-26 2	-26 2
Downlink Polarization Advantage (dB)	0 0	0 0
CARRIER INFORMATION		
Carrier ID	24M0G7W	24M0G7W
Carrier Modulation	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A
Information Rate(kbps)	16383	16383
Code Rate	1/2x188/204	1/2x188/204
Occupied Bandwidth(kHz)	20089	20089
Allocated Bandwidth(kHz)	24000	24000
Minimum C/N, Clear Sky (dB)	3 36	3 36
Minimum C/N, Rain (dB)	3 36	3 36
UPLINK EARTH STATION		
Earth Station Diameter (meters)	5 0	5 0
Earth Station Gain (dBi)	57 0	57 0
Earth Station Elevation Angle	20	20
DOWNLINK EARTH STATION		
Earth Station Diameter (meters)	60	90
Earth Station Gain (dBi)	35 5	39 0
Earth Station G/T (dB/K)	11 0	14 5
Earth Station Elevation Angle	20	20
LINK FADE TYPE	Clear Sky	Clear Sky
UPLINK PERFORMANCE		
Uplink Earth Station EIRP (dBW)	72 2	72 2
Uplink Path Loss, Clear Sky (dB)	-209 2	-209 2
Uplink Rain Attenuation	0 0	0 0
Satellite G/T(dB/K)	8	8
Boltzman Constant(dBW/K-Hz)	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-73 0	-73 0
Uplink C/N(dB)	19 3	19 3
DOWNLINK PERFORMANCE		
Downlink EIRP per Carrier (dBW)	48 8	46 8
Antenna Pointing Error (dB)	- 5	- 5
Downlink Path Loss, Clear Sky (dB)	-206 2	-206 2
Downlink Rain Attenuation	0 0	0 0
Earth Station G/T (dB/K)	11 0	14 5
Boltzman Constant(dBW / K - Hz)	228 6	228 6
Carrier Noise Bandwidth (dB-Hz)	-73 0	-73 0
Downlink C / N(dB)	8 6	10 1
COMPOSITE LINK PERFORMANCE		
C/N Uplink (dB)	19 3	19 3
C/N Downlink (dB)	8 6	10 1
C/I Intermodulation (dB)	N/A	N/A
C/I Uplink Co-Channel (dB)*	27 0	27 0
C/I Downlink Co-Channel (dB)*	27 0	27 0
C/I Uplink Adjacent Satellite 1 (dB)	30 4	30 4
C/I Downlink Adjacent Satellite 1 (dB)	22 0	20 1
C/I Uplink Adjacent Satellite 2 (dB)	29 3	29 3
C/I Downlink Adjacent Satellite 2 (dB)	23 2	22 2
C/(N+I) Composite (dB)	7 8	8 9
Required System Margin (dB)	-1 0	-1 0
Net C/(N+I) Composite (dB)	6 8	7 9
Minimum Required C/N (dB)	-3 4	-3 4
Excess Link Margin (dB)	3 5	4 5
Number of Carriers	1 0	1 0
CARRIER DENSITY LEVELS		
Uplink Power Density (dBW/Hz)	-57 8	-57 8
Downlink EIRP Density At Beam Peak (dBW/Hz)	-20 2	-20 2

APPENDIX B

ANTENNA BEAM CONTOURS

Figure B-1. DIRECTV 1R Receive Beam
[Schedule S Beam Designation: RUL]

Beam Peak Antenna Gain: 34.3 dBi
Beam Peak G/T: 6.8 dB/K
Beam Peak Saturated Flux Density: -103.8 to -85.8 dBW/m^2

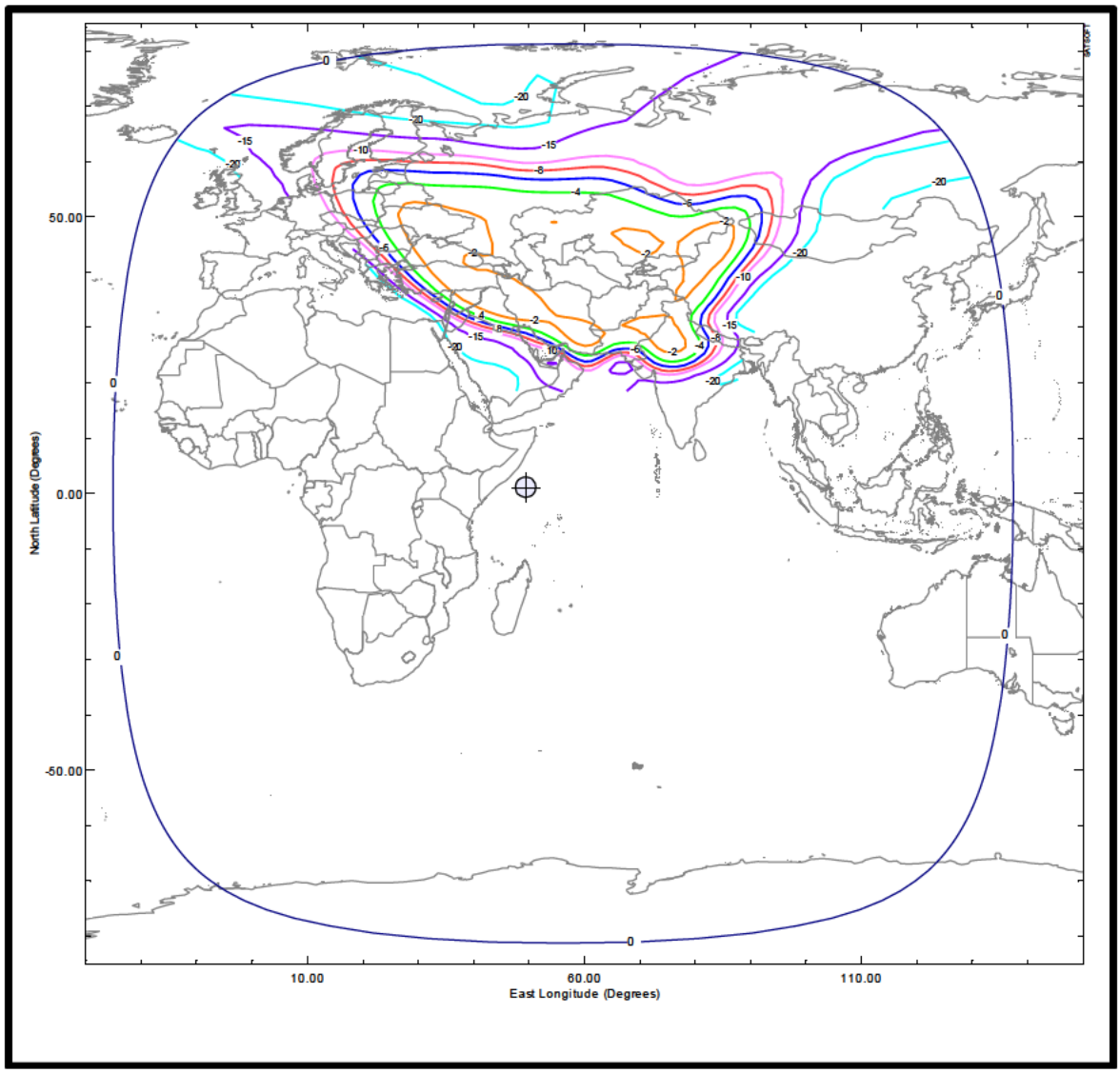


Figure B-2. DIRECTV 1R Transmit Beam
[Schedule S Beam Designation: RDL]

Beam Peak Antenna Gain: 36.3 dBi
Beam Peak EIRP: 57.8 dBW

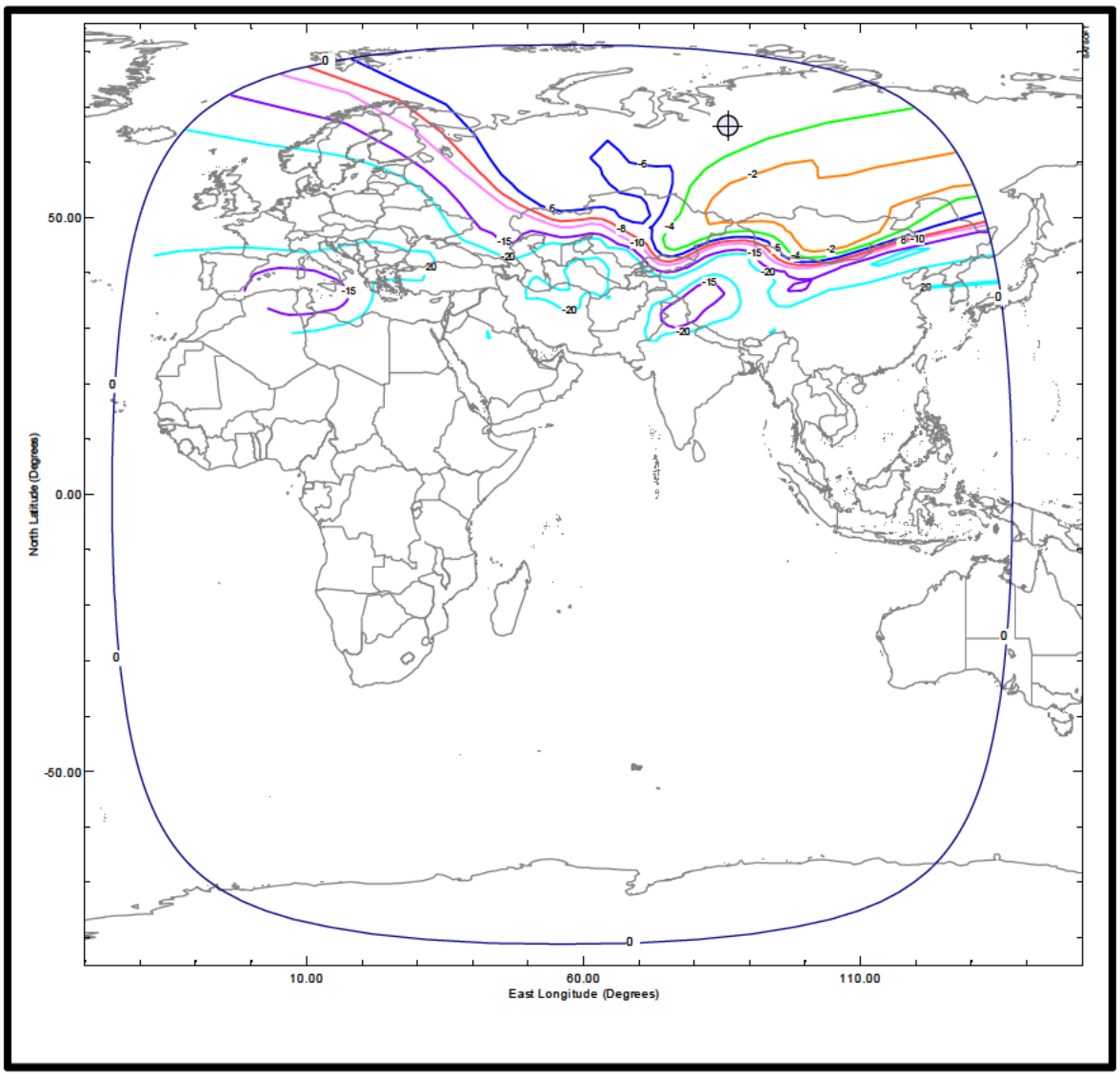
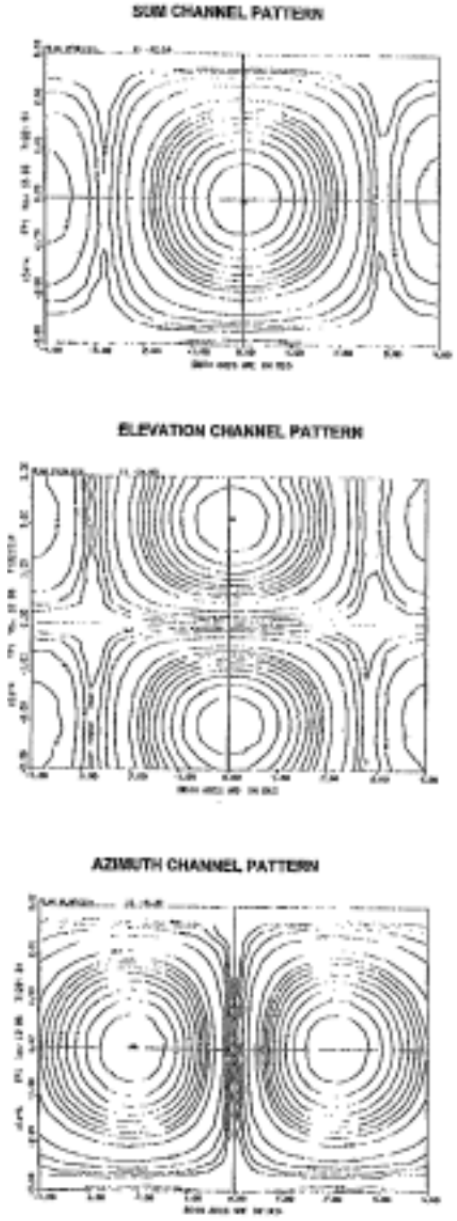


Figure B-3. DIRECTV 1R On-station Command Receive Beam (Planar Antenna)



APPENDIX C

POWER FLUX DENSITY CALCULATIONS

TABLE C.1: POWER FLUX DENSITY CALCULATIONS

FREQUENCY BAND : 12250 - 12500 MHz							
Telemetry [Reflector Antenna]							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	19.1	19.1	19.1	19.1	19.1	19.1	19.1
Carrier Occupied Bandwidth (kHz)	800	800	800	800	800	800	800
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-167.3	-167.2	-167.1	-167.0	-166.8	-166.7	-166.0
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	19.3	19.2	21.6	24.0	26.3	28.7	28.0
Telemetry [Bicone Antenna]							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	11.4	11.4	11.4	11.4	11.4	11.4	11.4
Carrier Occupied Bandwidth (kHz)	800	800	800	800	800	800	800
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-175.0	-174.9	-174.8	-174.7	-174.5	-174.4	-173.7
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	27.0	26.9	29.3	31.7	34.0	36.4	35.7
Telemetry [Pipe Antenna]							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	11.8	11.8	11.8	11.8	11.8	11.8	11.8
Carrier Occupied Bandwidth (kHz)	800	800	800	800	800	800	800
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-174.6	-174.5	-174.4	-174.3	-174.1	-174.0	-173.3
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	26.6	26.5	28.9	31.3	33.6	36.0	35.3